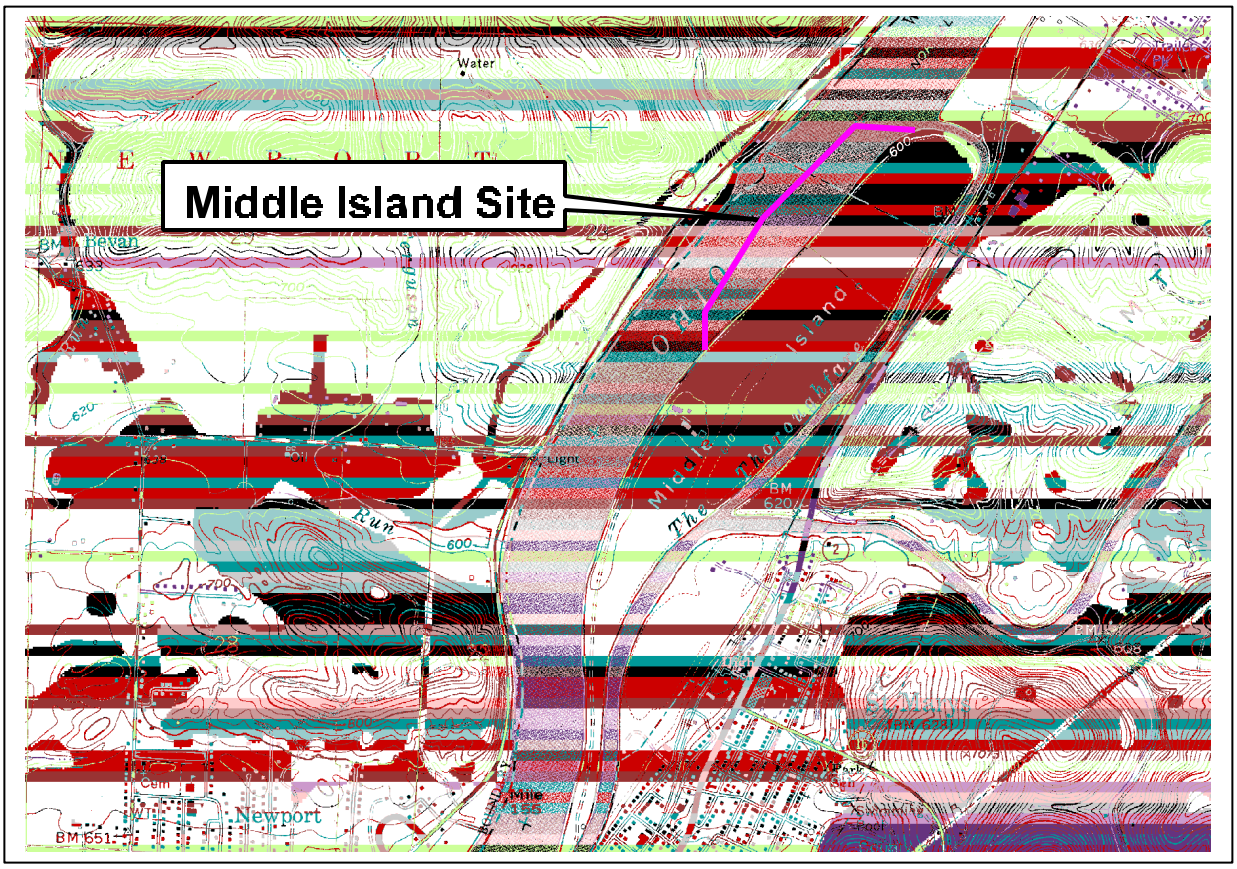
MIDDLE ISLAND (WV-35)

1.0 Location

The proposed Middle Island restoration project area is located in Pleasants County, West Virginia approximately 1.5 miles upstream of the community of St. Mary's, West Virginia. The project is within the Ohio River Willow Island Pool. Middle Island is located between Ohio River Mile (ORM) 152.9 and 155.2. The project is within the jurisdiction of the Huntington District, U.S. Army Corps of Engineers (USACE).



2.0 Project Goal, Description, and Rationale

The primary goals of the Middle Island habitat restoration project are to provide increased habitat diversity and improved fish spawning habitat in the area. The enhanced habitat would increase species diversity, increase fish abundance, and facilitate in the development of a sustained fishery resource and improved recreational fishery.


Ohio River adjacent to Middle Island

Habitat diversity will be developed by creating a series of off-shore rock revetments along the main channel border adjacent to Middle Island. Four rock structures, three structures approximately 90 feet in length and a fourth structure

200 feet in length, will be created at the site. This series of structures placed along the channel border will provide variable current regimes, velocity shelters, hard substrates for invertebrate colonization and fish spawning thereby improving the habitat in the area.

3.0 Existing Conditions

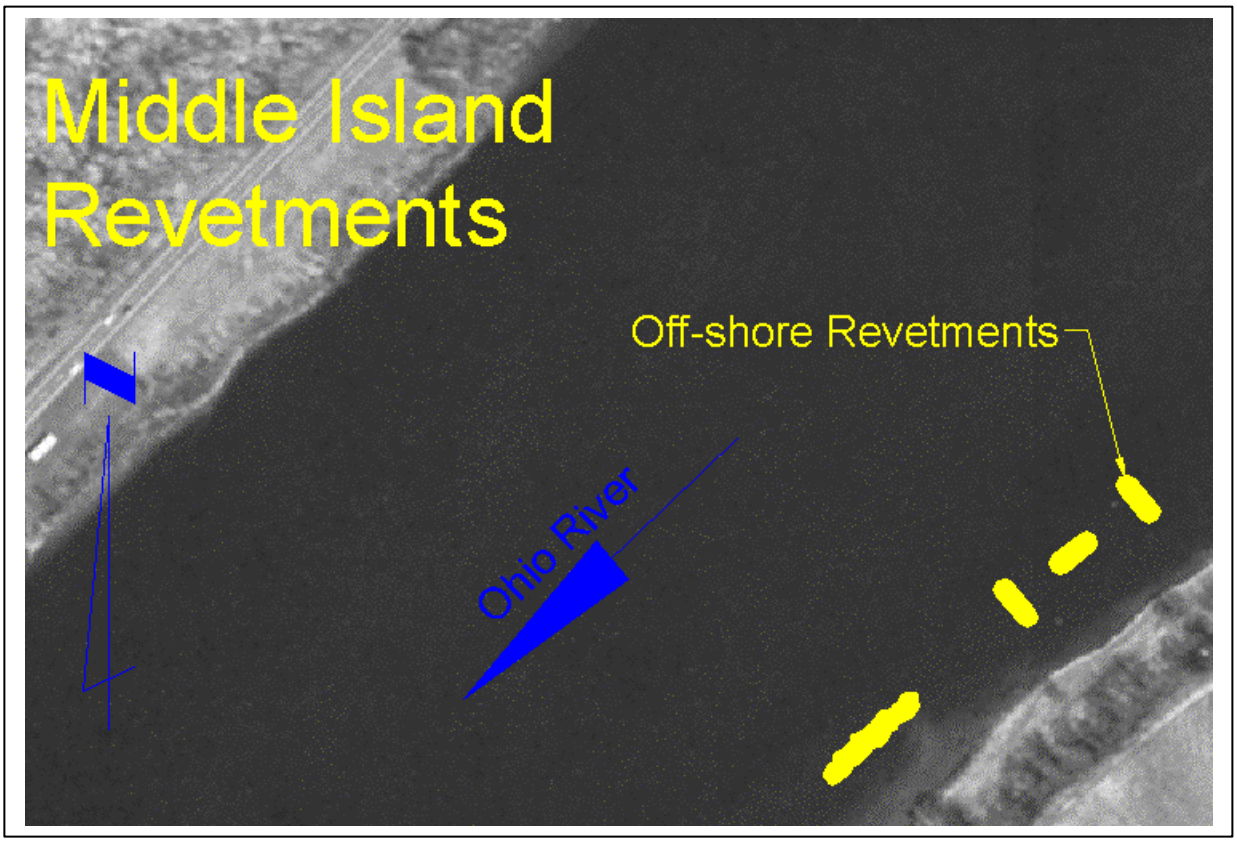
Terrestrial/Riparian Habitat: The Middle Island site is a riverine site with terrestrial vegetation present along the shoreline of Middle Island adjacent to the site. The shoreline near the project site contains riparian vegetation dominated by silver maple, *Acer saccharinum*. Portions of the adjacent shoreline have been rip-rapped.

Aquatic Habitats: The aquatic habitat at the site is main channel border. The area consists of a gently sloping river bottom with water depths ranging from approximately 15 feet deep (30 yards from shore) to approximately 40 feet deep (125 yards from shore). The river bottom is comprised of sand and silt. Off bottom structure (e.g. rock piles, snags, etc.) is present in the area. The shoreline immediately adjacent to the Middle Island site is shallow (0 to 5 feet deep) with some fallen trees providing cover for aquatic organisms.

Wetlands: The Middle Island site is a riverine aquatic site adjacent to an urban area. There are no jurisdictional wetlands present in the immediate vicinity of the project site. Wetlands in the vicinity of the project would be restricted to the bottomland hardwoods associated with the riparian zone adjacent to the Ohio River.

Federally-Listed Threatened and Endangered Species: No federally listed threatened or endangered species are known to occur in Pleasants County, West Virginia (USFWS, 1999).

4.0 Project Diagram



5.0 Engineering Design, Assumptions, and Requirements

5.1 Existing Ecological/Engineering Concern

The Ohio River channel adjacent to Middle Island has very little habitat diversity. Strong river currents limit the natural deposition of structure, such as snags. The creation of the proposed off-shore revetments would provide a complex structure that would increase submerged habitat. In addition to the added hard substrate, the altered bathymetry associated with changes in water flow would also enhance habitat diversity.

5.2 Off-Shore Revetments

An off-shore revetment is a rock structure designed to provide velocity shelters for aquatic animals. A group of three structures would be placed 500 feet downstream of the head of Middle Island at ORM 153.2. The structures would be 90 feet in length, with two perpendicular and one parallel to main Ohio River Channel. The side slopes would be 1.5 to 1, and the structure would be toed into the sub-grade a minimum of 2 feet. The structures would have a constant top elevation of 592, which is 10 feet below the normal pool. A fourth structure would be constructed 200 feet downstream of the group of three. This structure would be 200 feet in length and parallel to the main Ohio River Channel. The structure would vary in width from 25 to 45 feet, and stand between 2.5 to 10 feet in height. The size of the rock used (for all structures) shall be uniformly graded

limestone with each rock weighing between 50 and 150 pounds. Normally a well-graded rock would be used, however, a uniform gradation would provide better aquatic habitat.

5.3 Planning/Engineering Assumptions

- Average channel velocities are 3 feet per second.
- All rock material would be shipped by barge to the project site. All costs for shipping are included in the material costs.
- Excavated material from site preparation can be disposed of into the main river channel.

6.0 Cost Estimate (Construction):

Engineering costs for the proposed project are contained on Table 1. A detailed MCACES cost estimate for the proposed project is included in Appendix C.

Table 1. Engineering Costs.	
Item	**Cost**
Off-shore Revetments (Group of Three)	$60,000
Off-shore Revetments (Irregular)	$60,700
Mobilization	$15,000
TOTAL	**$135,700**

7.0 Schedule: The estimated construction time for this project is shown on Table 2.

Table 2. Construction Schedule.	
Item	**Time**
Off-shore Revetments (Group of Three)	3 Days
Off-shore Revetments (Irregular)	4 Days
Mobilization	4 Days
TOTAL	**11 Days**

8.0 Expected Ecological Benefits

Terrestrial/Riparian Habitats: The beneficial impacts of the Middle Island restoration project would be in-stream. There would be no reasonably foreseeable beneficial impacts to terrestrial/riparian resources as a result of implementing the proposed project.

Aquatic Habitats: Long-term beneficial impacts to aquatic resources would be anticipated as a result of constructing the Middle Island off-shore revetments. The complex structure of the rip-rap revetment coupled with localized changes in flow patterns and the scouring effects downstream from the rock revetments would lead to improved habitat diversity for aquatic species. Habitat requirements for fishes change seasonally. The revetment structure and the changes in bathymetry associated with the altered water flow from the structure would provide variable velocity regimes in the area.

The addition of the hard substrate (rip-rap) would result in long-term beneficial impacts to other aquatic species, especially benthic macroinvertebrates, due to the increase in the habitat diversity. The rip-rap revetment would provide more silt-free submerged surface area for invertebrates as well as escape cover for various invertebrates and small fishes.

Previous fisheries surveys in the area have revealed that spotted bass, channel catfish, sauger, and other species occur in the area (WVDNR, 1988). These and other species will benefit from the proposed site improvements.

Wetlands: The beneficial impacts of the Middle Island restoration project would be in-stream. There would be no reasonably foreseeable beneficial impacts to wetland resources as a result of implementing the proposed project.

Federally-Listed Threatened and Endangered Species: There would be no reasonably foreseeable beneficial impacts to threaten and endangered species as a result of implementing the proposed project.

Socioeconomic Resources: There would be short-term and long-term beneficial impacts to socioeconomic resources as a result of implementing the proposed project. The short-term beneficial impacts would be related to costs and local expenditures associated with the construction of the revetments. Long-term socioeconomic benefits would be realized through improved recreational fishing opportunities.

9.0 Potential Adverse Environmental Impacts

Terrestrial/Riparian Habitats: During the site preparation and construction of the revetments, there would be a potential for short-term adverse impacts to terrestrial species from construction-related noise and disturbance. Considering the lack of quality terrestrial habitat and the existing high volume of disturbance from barge and recreational boat traffic along the Ohio River, it is likely that the increased noise/disturbance impacts would be very minor.

Aquatic Habitats: There would be a potential for adverse affects to aquatic species, especially immobile benthic invertebrates during the construction of the Middle Island off-shore revetments. Localized populations of benthic invertebrates could be covered with rip-rap during the construction of the revetments. In addition, sensitive aquatic species immediately downstream from the site could be adversely impacted by degraded water quality associated with displaced sediments, especially during the site preparation/excavation. The adverse impacts to aquatic species would be short term, and the overall beneficial impacts of the restoration project would outweigh the adverse impacts.

Wetlands: There would be no reasonably foreseeable adverse impacts to wetland habitats as a result of implementing the proposed project.

Federally-Listed Threatened and Endangered Species: There would be no reasonably foreseeable adverse impacts to threaten and endangered species as a result of implementing the proposed project.

Socioeconomic Resources: There would be no reasonably foreseeable adverse socioeconomic impacts as a result of implementing the proposed project.

10.0 Mitigation

Minor impacts associated with site preparation/excavation and rock (rip-rap) placement may occur during the construction of this project, however, no significant adverse impacts are expected. The use of best management practices and proper construction techniques would minimize adverse water quality impacts. No substantial mitigation measures would be necessary to complete this project.

11.0 Preliminary Operation and Maintenance Costs:

Operation and Maintenance costs are summarized on Table 3.

Table 3. Operation and Maintenance Costs		
Maintenance	**Frequency**	**Costs**
Repair of Rock Structures	10 years	$27,000

12.0 Potential Cost Share Sponsor(s)

West Virginia Department of Natural Resources

13.0 Expected Life of the Project

It is anticipated that the revetment structures would have an intact life expectancy of 50 years.

14.0 Hazardous, Toxic, and Radiological Waste Considerations

Potential impacts of hazardous, toxic, and radiological waste (HTRW) at this concept site were visually assessed during a site visit on June 15, 1999.

Site Inspection Findings

The Ohio River flows from northeast to southwest past the project site in the Ohio River off Middle Island, which is part of the Ohio River Islands National Wildlife Refuge. Pleasants County, West Virginia and Washington County, Ohio border the project area on the south and north sides of the Ohio River, respectively. The town of St. Marys, WV is located on the Ohio River and extends from the south tip of Middle Island to the island's mid-section. The town of Grape Island, WV is about 0.75 miles northeast of the project site on the Ohio River. Wade and Newport, Ohio are located about two miles northeast and southwest, respectively of the project area.

The following environmental conditions were considered when conducting the June 15, 1999 project area inspection:

- Suspicious/Unusual Odors;
- Discolored Soil;
- Distressed Vegetation;
- Dirt/Debris Mounds;
- Ground Depressions;
- Oil Staining;
- Above Ground Storage Tanks (ASTs);
- Underground Storage Tanks (USTs);
- Landfills/Wastepiles;
- Impoundments/Lagoons;
- Drum/Container Storage;
- Electrical Transformers;
- Standpipes/Vent pipes;
- Surface Water Discharges;
- Power or Pipelines;
- Mining/Logging; and
- Other.

None of the environmental conditions listed above were observed in the project area.

15.0 Property Ownership & River Access

Selected data on properties immediately adjacent to the concept site was collected from the county courthouse of the respective county of each site. Data collected included map and parcel identification number, property owner's name and mailing address, acreage of the potentially affected parcel, and market value of the parcel. This procedure involved obtaining a plat or parcel map of the site and surrounding area which identified each parcel with a corresponding map and parcel number. The map\parcel identification number was subsequently used to determine the property owner's name and mailing address from records in the County Assessor's or County Auditor's office.

The market value of each parcel as contained in the property tables reflects the assessed valuation to supposedly market value ratio used by the State for taxation purposes. These assessed values reflect 1998 assessments. The assessed valuation ratio is 60 percent for West Virginia.

The above ratio was used to approximate the market value of each property. However, in many instances the resultant market value calculated under the above procedure is considerably below the actual value of the land in the real market. Local real estate brokers could provide a more accurate estimate of actual land values.

The collected property data indicate that the adjacent land is owned by USACE. Access to this site for the purpose of completing the proposed project will require no agreements with local landowners as access to create the revetments will be directly form the river. No land based activities will be required at the site.

Table 4. Property Characteristics

Site Name: Middle Island
Location: Pleasants County, West Virginia

Map/Parcel Number	Owner	Mailing Address	Market Value	Acreage
1/1	U.S. Government	Army Corps of Engineers Huntington, WVA District		
1/1.1	(same)	(same)		
1/1.2	(same)	(same)		
1/2	(same)	(same)		
1-2.1	(same)	(same)		
1/3	(same)	(same)		
1/4	(same)	(same)		
8/1	(same)	(same)		

* Denotes improvements on property.

16.0 References

WVDNR, 1982	West Virginia DNR. 1982. Stream Survey Data Form, Back channel of Middle Island. S. Morrison, Biologist. Cat No. 1943.
USFWS, 1999	U.S. Fish and Wildlife Service, July 6, 1999. Federally Listed Endangered and Threatened Species in West Virginia.

APPENDIX A Threatened & Endangered Species

APPENDIX B Plan Formulation and Incremental Analysis Checklist

Project Site Location:

The proposed Middle Island restoration project area is located in Pleasants County, West Virginia approximately 1.5 miles upstream of the community of St. Mary's, West Virginia. The project is within the Ohio River Willow Island Pool. Middle Island is located between Ohio River Mile (ORM) 152.9 and 155.2. The project is within the jurisdiction of the Huntington District, U.S. Army Corps of Engineers (USACE).

Description of Plan selected:

The primary goals of the Middle Island habitat restoration project are to provide increased habitat diversity and improved fish spawning habitat in the area. The enhanced habitat would increase species diversity, increase fish abundance, and facilitate in the development of a sustained fishery resource and improved recreational fishery.

Habitat diversity will be developed by creating a series of off-shore revetments along the main channel border adjacent to Middle Island. Four rock structures, three structures approximately 90 feet in length and a fourth structure 200 feet in length, will be created at the site.

Alternatives of the Selected Plan:

Smaller Size Plans Possible? **Yes** and description

Reduce the size of the structures.

Larger Size Plan Possible? **Yes** and description

Increase the number of structures.

Other alternatives? **No**

Restore/Enhance/Protect Terrestrial Habitats? No **Objective numbers met**

Restore, Enhance, & Protect Wetlands? No **Objective numbers met**

Restore/Enhance/Protect Aquatic Habitats? Yes **Objective numbers met** A2

Type species benefited: Wide variety of fish species including sauger and catfishes.

Endangered species benefited: None

Can estimated amount of habitat units be determined: Approximately 470 linear feet of off-shore revetment will be created.

Plan acceptable to Resources Agencies?

U.S. Fish & Wildlife Service?

State Department of Natural Resources? Yes – West Virginia DNR

Plan considered complete? **Connected to other plans for restoration?**

Real Estate owned by State Agency? No **Federal Agency?** Yes
Real Estate privately owned? No
If privately owned, what is status of future acquisition None required.

Does this plan contribute significantly to the ecosystem structure or function requiring restoration? What goal or values does it meet in the Ecosystem Restoration Plan?

Provides habitat diversity including hard substrates for spawning and macroinvertebrate colonization as well as variability in local current velocities.

Is this restoration plan a part of restoration projects planned by other agencies? (i.e. North American Waterfowl Management Plan, etc.)

No

In agencies opinion is the plan the most cost effective plan that can be implemented at this location?

Can this plan be implemented more cost effectively by another agency or institution?
Yes / No
Who:

From an incremental cost basis are there any features in this plan that would make the project more expensive than a typical project of the same nature? For embayment type plans is there excessive haul distance to disposal site? More expensive type disposal? Spoil that requires special handling/disposal?

Potential Project Sponsor:

Government Entity:_____
Non-government Entity _____

Corps Contractor _____Date_____

U.S. Fish & Wildlife Representative _____Date_____

State Agency Representative _____Date _____

U.S. Army Corps of Engineers Representative _____Date _____

Terrestrial Habitat Objectives

T1 Riparian Corridors

T2 Islands

T3 Floodplains

T4 Other unique habitats (canebrakes, river bluffs, etc.)

Wetland Habitat Objectives

W1 Forested Wetlands: Bottomland Hardwoods

W2 Forested Wetlands: Cypress/Tupelo Swamps and other unique forested wetlands

W3 Scrub/Shrub Emergent Wetlands: isolated from the river except during high water and contiguous (includes scrub/shrub wetlands in embayments and island sloughs)

Aquatic Habitat Objectives

A1 Backwaters (sloughs, embayments, oxbows, bayous, etc.)

A2 Riverine submerged and aquatic vegetation

A3 Sand and gravel bars

A4 Riffles/Runs (tailwaters)

A5 Pools (deep water, slow velocity, soft substrate)

A6 Side Channel/Back Channel Habitat

A7 Fish Passage

A8 Riparian Enhancement/Protection

APPENDIX C Micro Computer-Aided Cost Engineering System (MCACES)